An Economic Evaluation of the Parent–Child Assistance Program (P-CAP) for Preventing Fetal Alcohol Spectrum Disorder in Alberta, Canada

Thanh et al. 2013

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Background

- P-CAP is a three-year home-visitation/case-management/harm reduction mentorship intervention model.
- Initiated in 1991 by a research team at the University of Washington.
- Serves women who abuse substances (e.g. alcohol and/or drugs) and are pregnant or up to six months post-delivery.

Background

The goals of P-CAP are to:

- prevent subsequent alcohol and drug-exposed births by encouraging the use of effective contraceptives and helping women decrease their use of alcohol and drugs or abstain completely from them
- address the health and social wellbeing of the mothers and their children by increasing employment and reducing their dependency on welfare income

Background

- The P-CAP model has been replicated at many other locations in North America
- In Alberta: P-CAP models have been applied with different names:
  - "First Steps" in 1999 (by Catholic Social Services, Bissell Center, and Lethbridge),
  - "P-CAP" in 2000 (by McMan, Calgary), and
  - "Mothers to be Mentorship Program" in 2001 (by Lakeland Center for FASD, Cold Lake)

Background

- In 2003, the Alberta FASD Cross-Ministry Committee (FASD-CMC) was established to plan and deliver provincial government programs and services associated with FASD.
- The FASD Service Networks were established to provide diagnostic, supportive, and preventive services.
- P-CAP is one of the preventive services provided by the networks since 2008.
- There are currently 25 P-CAP programs across the province.
- Between 2008 and 2011, there have been 366 P-CAP clients served by the networks

Objectives

- Ernst et al. (1999), Grant et al. (2005), and Rasmussen et al. (2012) demonstrated the P-CAP to be effective.
- However, neither the original P-CAP program nor its replications have ever been evaluated in an economic perspective.
- This study aims to economically evaluate (both the cost-effectiveness and cost-benefit analyses) the Alberta FASD-CMC funded P-CAP

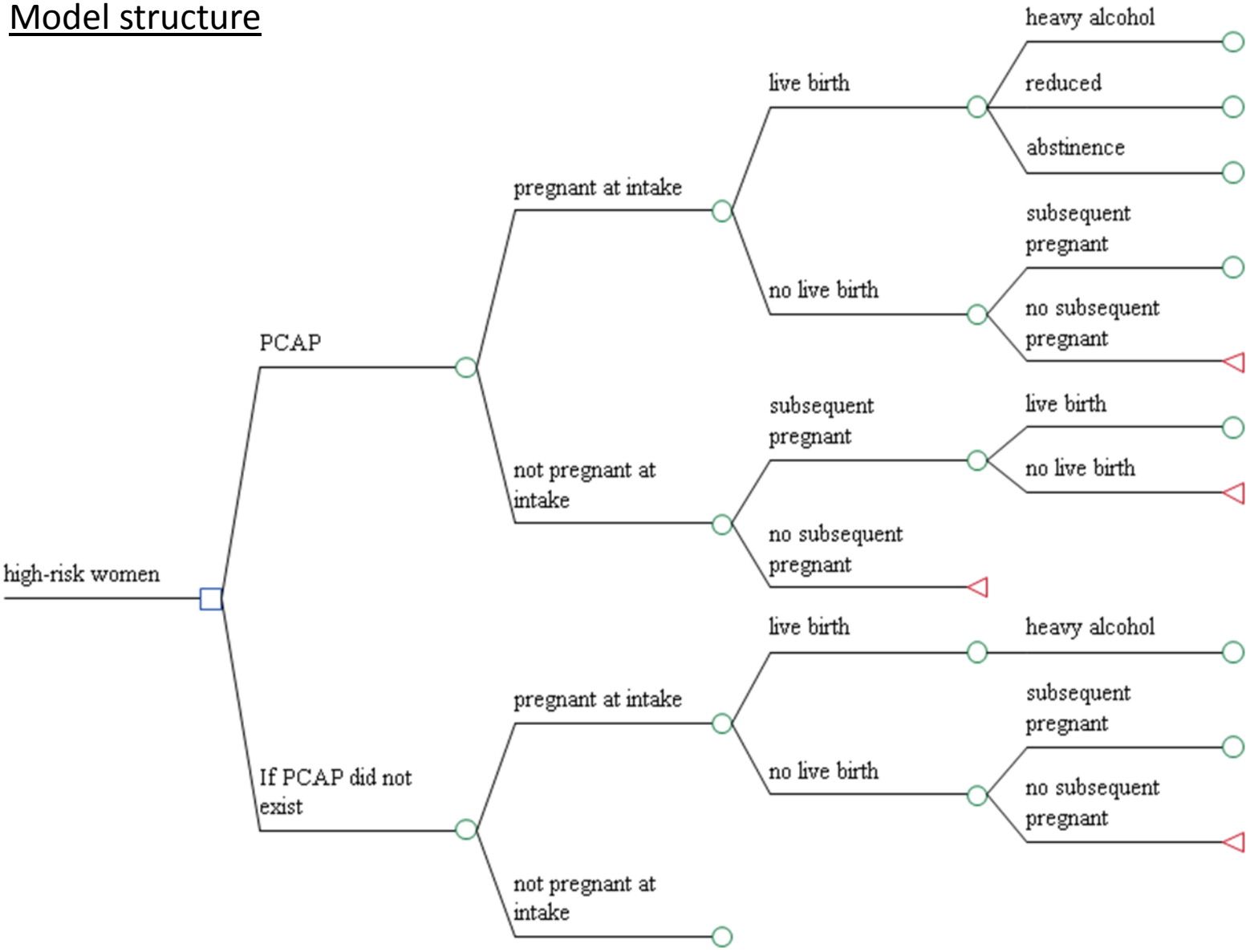
Methods

- A decision analytic modeling technique to compare costs and outcomes of 2 options:
  - P-CAP exists
  - P-CAP did not exist
- Cost-effectiveness analysis to estimate the incremental cost per prevented case.
- Cost-benefit analysis to estimate the net monetary benefit of the P-CAP program
  - the number of prevented cases was monetized to compare with the actual cost of P-CAP

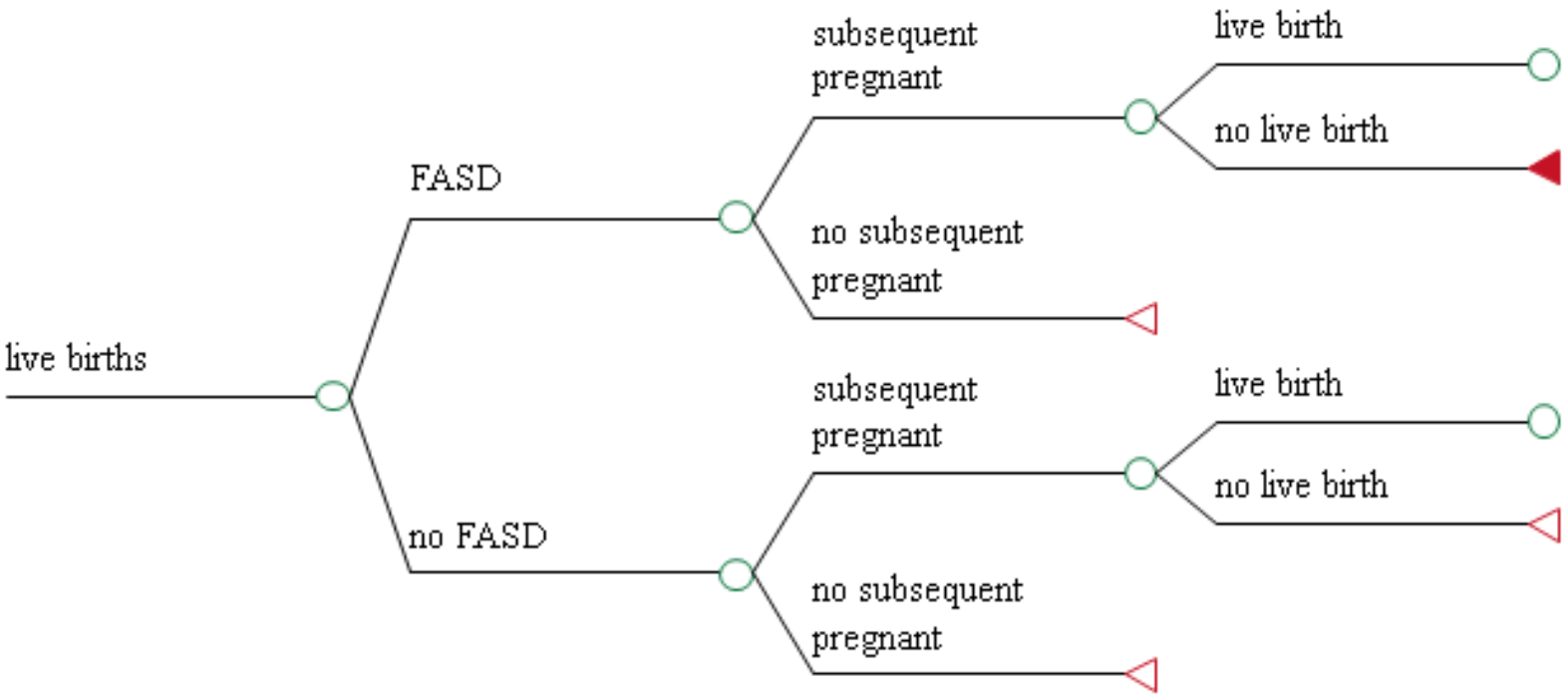
Methods

- Study population: 366 women, who have been served by the Alberta FASD-CMC P-CAP from 2008 to 2011.
  - Only the alcohol users, who accounted for 44% of the total (95% CI: 29% to 60%) were included in the analysis
    - drug users were not included
- Time horizon: 3 years
  - the estimated costs and benefits occur within a 3-year period

Model structure



Model structure



Model structure for option 1: P-CAP exists

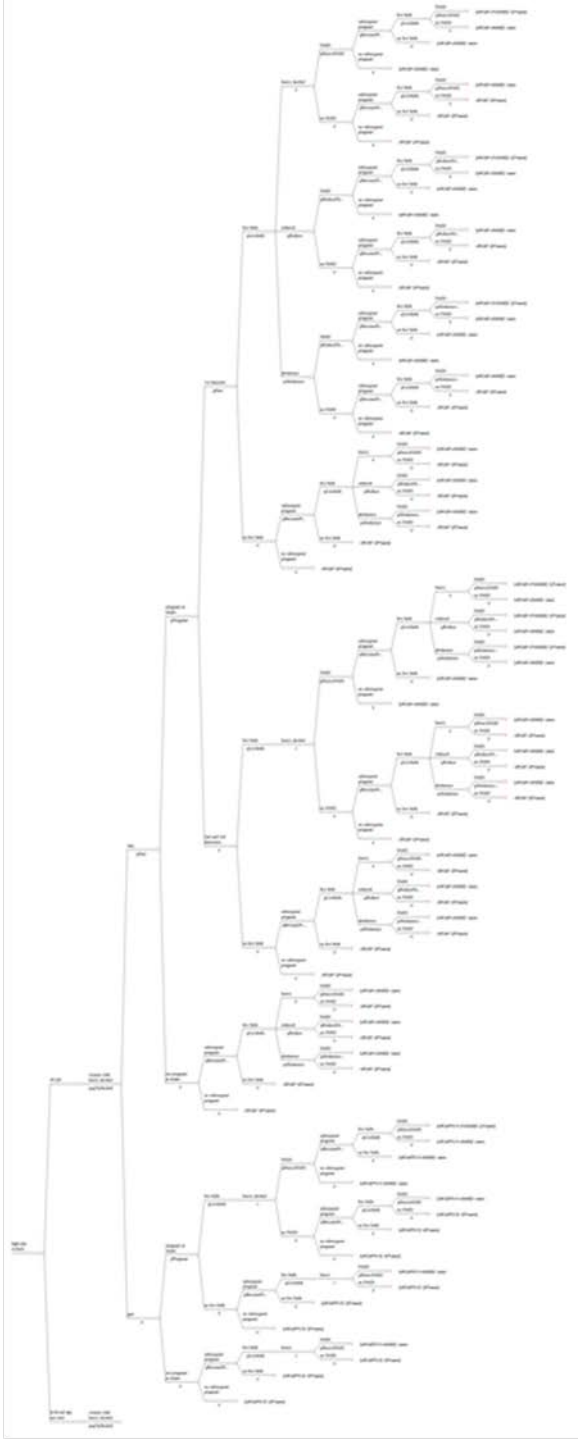
Women with heavy alcohol consumption entering P-CAP:

- Stay for 3 years or quit.
- Pregnant at intake or not (e.g. post-delivery <=6 months).
- Subsequent pregnancy or not
- Those who are in the 2nd and 3rd trimesters of pregnancy at intake and those who are not pregnant at intake, the impact of P-CAP is only on the subsequent pregnancies if they have one.
- Only the 1st subsequent pregnancy was included because very few had more than 1 in the 3-year time.

Model structure for option 1: P-CAP exists

- Those who are in the 1st trimester of pregnancy at intake and if they have a subsequent pregnancy, the impact of P-CAP is on both pregnancies.
- Pregnant women: live births or not
- Live births: FASD or not.
- The impact of P-CAP includes:
  - a reduction and abstinence from alcohol.
  - a reduced rate of subsequent pregnancy.
    - due to the increased use of contraceptives.

  -> result in a reduction of live births exposed to heavy alcohol consumption during pregnancy, and therefore in a reduction of the number of FASD cases



Model structure for option 2 (P-CAP did not exist):

similar to option 1, except there is no impact of P-CAP -> results in:

- A higher rate of subsequent pregnancy (due to lower use of contraceptives)

- All the live births exposed to heavy alcohol consumption during pregnancy, thus resulting in more FASD cases.


high-risk women
PCAP
women with heavy alcohol
pop*pAlcohol
If PCAP did not exist
women with heavy alcohol
pop*pAlcohol
pregnant at intake
pPregnant
not pregnant at intake
#
live birth
pLivebirth
heavy alcohol
1
no live birth
#
FASD
pHeavyFASD
no FASD
#
subsequent pregnant
pBecomePr...
no subsequent pregnant
#
live birth
pLivebirth
no live birth
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FASD
pHeavyFASD
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heavy
1
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cPCAP0 \ [0*cases]

Model inputs

- The actual data from the Alberta's FASD service networks.
- Systematic review of the literature and a meta-analysis to pool the inputs if the actual data is not available.

Variable Name	Description	Mean	Low	High	Data sources
pStay	Probability of women who stay in P-CAP	0.91	0.87	0.94	(Alberta FASD Service Networks 2012)
pAlcohol	Probability of alcohol use among P-CAP women	0.44	0.29	0.60	(Pelech et al 2013)
pPregnant	Probability of pregnancy at intake	0.49	0.43	0.55	(Alberta FASD Service Networks 2012)
pFirst	Probability of pregnancy in the first trimester at intake	0.16	0.07	0.29	(Pelech et al 2013)
pLivebirth	Probability of giving live births	0.87	0.80	0.92	(Alberta FASD Service Networks 2012)

Model inputs

Variable Name	Description	Mean	Low	High	Data sources
pReduce	Probability of women who reduce alcohol use due to P-CAP	0.64	0.58	0.70	(Alberta FASD Service Networks 2012)
pAbstinence	Probability of women who abstinence from alcohol due to P-CAP	0.11	0.08	0.16	(Alberta FASD Service Networks 2012)
pBecomePregnant	Probability of subsequent pregnancy if P-CAP exists	0.29	0.18	0.41	Rasmussen et al 2012
pBecomePregnant2	Probability of subsequent pregnancy if P-CAP did not exist	0.42	0.29	0.54	Rasmussen et al 2012
pHeavyFASD	Probability of FASD among heavily exposed to alcohol during pregnancy	0.69	0.54	0.84	Auti-Ramo et al. 1992; Astley 2010; Aronson et al. 1985; Auti-Ramo 2000; Kuehn et al. 2012; Godel et al. 2000; Kyllerman et al. 1985

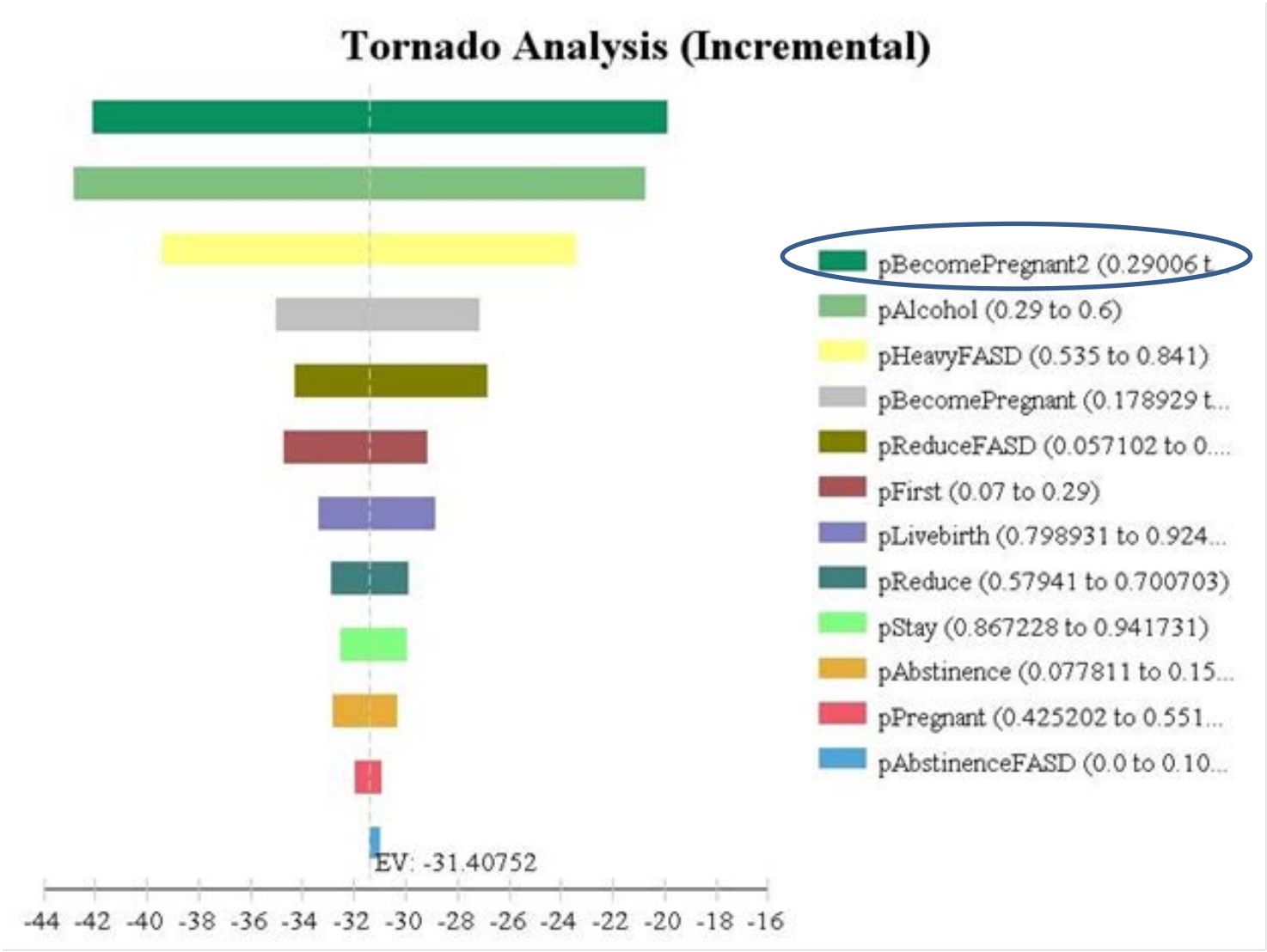
Model inputs

Variable Name	Description	Mean	Low	High	Data sources
pReduceFASD	Probability of FASD among reduced exposure to alcohol during pregnancy	0.15	0.06	0.30	Auti-Ramo et al. 1992
pAbstinenceFASD	*Upper value of 95% CI of probability of FASD among light exposure to alcohol during pregnancy	0.00	0.00	0.10*	Godel et al 2000
cFASD	Incremental lifetime cost per case with FASD	800,000	640,000	960,000	Thanh et al 2011
cP-CAP	P-CAP cost per woman over the 3 year period	20,755	16,604	24,906	Alberta FASD-CMC 2013a,b

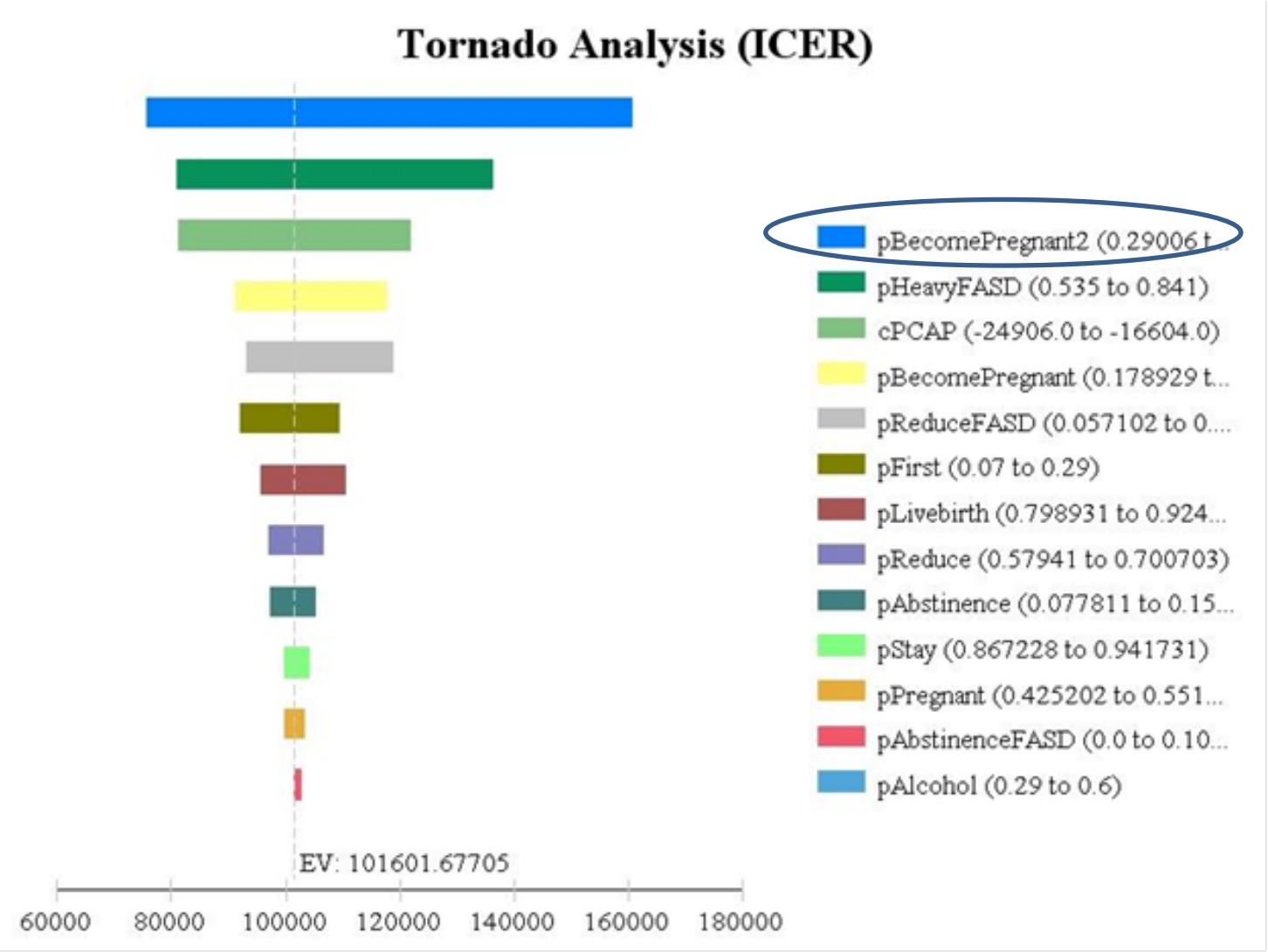
Results

	Average	Range
Number of prevented FASD cases	31	20 to 43
Incremental cost per prevented FASD case	$102,000	$76,000 to $161,000
Net monetary benefit	$22 million	$13 million to $30 million

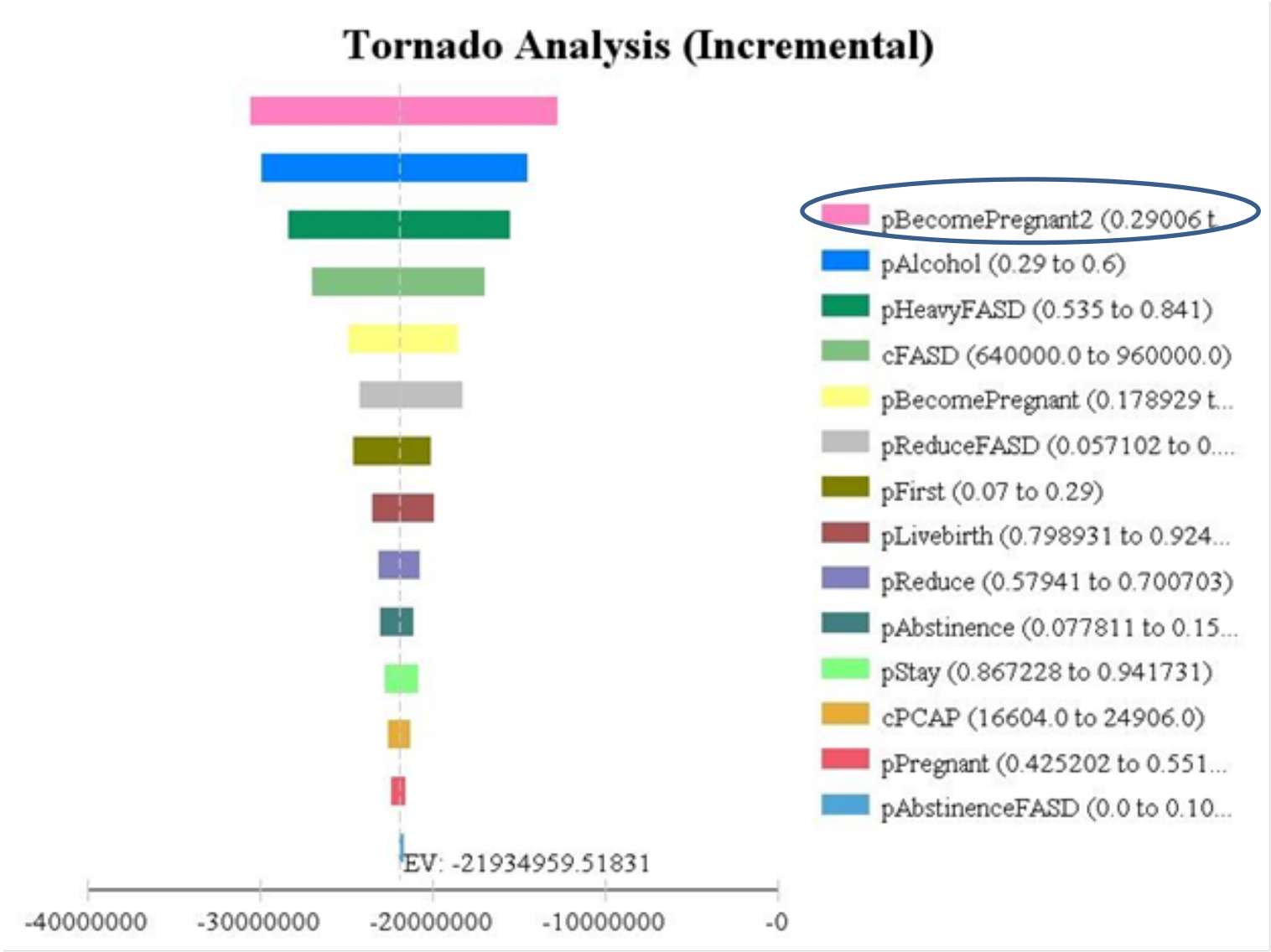
Sensitivity analysis: number of prevented FASD cases



Sensitivity analysis: incremental cost per prevented FASD case



Sensitivity analysis: net monetary benefit



Conclusion

- P-CAP is cost-effective and produces a significant net monetary benefit for Alberta.
- The increased use of contraceptives as a factor that has a significant impact on the outcomes.
- This finding supports placing a high priority not only on reducing alcohol use during pregnancy, but also on providing effective contraceptive measures when a program is launched.

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